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PREFACE

114 This medical survey and the health program connected with it was conceived by Mr. John Collier, who was Commissioner of Indian Affairs, Dr. Manuel Gamio, the Director of the Inter-American Indian Institute, and the Committees of Health and Sanitation of the National Indian Institutes of the United States and Nicaragua, and the Office of Inter-American Affairs.

121 The primary purpose of this study was to ascertain by what measure a health program could be initiated in a sequestered low-land tropical region for inhabitants who were autoctonous Indians to that area. The survey and the program were by no means complete since the main efforts were directed to the salient problems pertinent to the health of the people. Furthermore, considerable emphasis was given to the customs and habits of the Indians since any program in order to survive must be fitted into the lives of the people and the circumstances of the local situation. And, since the writer was specializing in the field of nutrition, the subject received disproportionate study.

122 123 The limitations of this study can be set forth. The first of these was the short time spent in the Coco Basin, a period of two months hardly being sufficient for a medical survey. The second was that no specific exhaustive anthropological method was used to study the social behavior of the Indians. But this second limitation is of no great consequence since the procedures ordinarily employed have not as yet attained quantitative values. But time should have been taken to gain a further insight into the views which these Indians held with respect to medical care. So far the authors' meagre observations form the only data from which to infer conclusions; certain "single methods" were employed and it is not too sanguine to state that still more important factors in the life, as it affects Public Health of these Indians are yet to be ascertained. Without, however, anticipating future inquiries, there is presented herewith those factors, medical and social, which the investigator deemed as sufficient in quantity to allow a recommendation for the health program of the Miskito without disrupting the social values of these people.

[p.3] [p.2 has no text material]

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262 [222] The Indians also secure honey from wild honey bees. In the Coco territory there are various species of stingless bees *(Meliponidae)*. The honey cells are circular and the honey is yellow and slightly acid in taste, it does not crystallize when kept for sometime. Previous to the introduction of sugar cane the honey was used to sweeten food.

The most important food of the Miskito Indian is the banana, even though it is not indigenous to America. As such this is one of the few examples where a food originally foreign to a people was immediately accepted an chronically utilized. On the other hand the use of cereals so common throughout the Americas, is infrequent. The reason for this is that cereals are difficult to grow in this territory. The numerous insects which attack certain types of vegetable or plant life restricts agricultural enterprise. Furthermore there appears to be no need of cereals in the diet. Beans have recently been introduced and in some communities they have been raised for eating purposes.

Oils are easily prepared from coconuts or varieties of nuts. These are crushed and placed in boiling water, and in due course the oil rises to the surface and is skimmed off.

262 177 It can be said that the Miskito Indians living as they are, unmolested, by the banks of rivers and streams secure enough wild fruits, vegetables, fish and game to adequately supply the yearly food. To this is added small agricultural projects of their own, such as banana plantations, citrus fruits, etc. When these Indians become sequestered in larger villages or are removed from their community to work for mines, rubber collection, or as laborers for fruit companies, the dietary deteriorates. To secure food under these new circumstances they need money, a substance which is easily expendable and does not represent a material which may be needed in the future. The Rubber Development Corporation has had in many instances fed laborers on foreign foods which have not always agreed with or been agreeable to workers.

NUTRITIONAL EVALUATION OF THE DIET

● 121 The evaluation of the nutritional status of individuals from any single examination of their diet is difficult if not impossible. There are widely divergent views regarding the needs of the body, as to the extent and character of the food requirements, of the relative merits of various foods and as to the degree and frequency of intake of the nutritional components. A survey of dietary intakes will often make one suspect a deficiency and may warn the investigator what to seek for In the end clinical appraisal is the only satisfactory method. There is

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today suficient evidence[36] to show that potential deficiency disease, latent deficiency disease and subclinical deficiency disease are unwarranted definitionally and that only the frank clinical manifestations are satisfactory for a diagnosis. Furthermore, the certain milder symptoms often ascribed to deficiency of a nutrient are more often related to another cause.[37] Thus, gingivitis has resulted, experimentally, from a deficiency of vitamin A,[38] of vitamin D,[39] of vitamin M,[40] of nicotinic acid [41] as well as ascorbic acid. Furthermore, most cases of gingivitis are unrelated to vitamin deficiency,[42], [43], [44] and in most instances does not respond to vitamin C therapy. Glossitis, furthermore, may be due to numerous causes other than nicotinic acid deficiency; cases with Bitot's spots are in most instances resistant to vitamin A therapy[45] and many exhibit vitamin A plasma levels usually encountered in healthy individuals.[46] Berliner[47] has questioned the diagnosis of xerosis conjunctivae as depicted by Kruse;[48] keratitis and corneal invasion found in rats on riboflavin free diets[49] does not occur in monkeys and in humans the lesions seen are more often due to other causes.[50] It must

[36] Dann, W. J., and Darby, W. J. The appraisal of nutriotional status (nutriture) in humans. Physiological Reviews, 1945, *25*, 326-346.

[37] Jeghers, H. Medical progress; nutrition; appearance of tongue as index of nutritional deficiency. New Eng. Jour. Medicine. 1942, *227*, 221-228.

[38] Wiehl, D. G., and Kruse, H. D. Milbank Mem. Fund. Quart. 1941, *19*, 241.

[39] Toppings, N. H., and Fraser, H. F. U. S. Public Health reports, 1939, 54, 416.

[40] Langston, W. C., Darby, W. J., Shukers, C. F., and Day, P. L. Nutritional cytopenia (Vitamin M deficiency) in monkey. Jour. Expl. Med. 1938, *68*, 923-940.

[41] Smith, D. T., Persons, E. L., and Harvey, H. I. On the identity of the Goldaberger and Underhill types of canine blacktongue. Jour. Nutrition, 1937, 14, 373.

[42] Restarski, J. S., and Pijoán, M. Gingivitis and vitamin C. Journal. Amer. Dent. Assoc., 1944, *31*, 1323-1327.

[43] Hess, A. H. Scurvy, past and present. Philadelphia, 1920.

[44] Stamm, W. P., Macrae, T. F., and Yudkin, S. Incidence of bleeding gums among RAF personnel and value of ascorbic acid in treatment. Brit. Med. Jour. 1944, *2*, 239.

[45] Metivier, V. M., Bitôt's spots in Trinidad. Amer. Jour. Ophth. 1941, *24*, 1029-1034.

[46] Darby, W. J. (unpublished observations, 1945).

[47] Berliner, M. L. Regarding early detection of avitaminosis A by gross or biomicroscopic examination of conjunctiva. Amer. Jour. Ophthal. 1942, *24*, 302-308.

[48] Kruse, H. D. Ocular manifestations of avitaminosis A. Dis. Eye, Ear, Nose and Throat. 1941. *1*, 272-287.

[49] Beasey, A. O., and Wolbach, S. B. Riboflavin deficiency in the rat. Jour. Expl. Med. 1939, *69*, 1

[50] Darby, W. J., and Milam, D. F. (1945, in press).

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121 be concluded that there exists no specific tissue alteration which alone may be considered pathognomonic of a single deficiency state: the deficiency must be characterized by all of the clinical signs and symptoms proven to result from a nutritional defect.

146 In regard to the Miskito Indians no cases of vitamin deficiency were observed, either by the use of the unproven criteria advocated by Kruse[51] or by the strict clinical evaluation of the subject. Marasmus and malnutrition were observed in infants suffering from diarrhoea, dysentery, or who were abandoned and deprived of food. But other than this finding, little can be said in favor of malnutrition. This becomes obvious in view of the foods these people consume: fruits in season and meats would militate against malnutrition. The people are generally robust and well built regardless of th[illegible]abits and while they eat only when hungry, without regular[illegible]must be admitted that such a method cannot be nutritionally unsound. At Waspook where large quantities of meat and vegetables are consumed the year round, eye lesions often ascribed to ariboflavinosis were commn but the local trader would generally assure a cure by selling dark glasses. The eye conditions were most bothlesome during the dry seasons and less so during the rainy season.

The brief study of the dietary habits show that the protein intake from animal food is high, that from legumes relatively low. It has been estimated that the Miskito Indian consumes from 150 to 300 gms. daily of protein, 150 gms. of fat and 200 gms. of carbohydrate; these figures vary somewhat but in general the relationship is about the same. Thus the caloric intake is from 2000-3000 calories daily. These are, of course, average figures determined over a period of time, since the Indian often goes withouh a significant food intake for periods of several days to a week. Except for the fact that the diet of the children may be somewhat low in calcium, there appears to be no dietary deficiencies among these people.

Some of the commonly consumed foods were analyzed and the results are as follows:

[51] Kruse, H. D. Handbook of Nutrition; medical evaluation of nutrional status. Jour. Amer. Med. Assoc. 1943, *20*, 584.